



DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD  
2461 EISENHOWER AVENUE  
ALEXANDRIA, VIRGINIA 22331-0600

05 MAY 2004

DDESB-KT

MEMORANDUM FOR HEADQUARTERS AIR FORCE SAFETY CENTER  
(ATTENTION: SEW)

SUBJECT: Approval of Updated Request for Approval of Reduced MCEs for F-15 and F-16 Aircraft with AIM Series Missiles

- References: (a) Memorandum of 20 February 2004 from HQ AFSC/SEW to DDESB-IK, Subject: Updated Request for Approval of Reduced MCEs for F-15 and F-16 Aircraft with AIM Series Missiles
- (b) DDESB-IK Memorandum of 2 July 2002, Subject: Approval of Proposed Noble Eagle Maximum Credible Events and Related Quantity-Distance
- (c) NSWC Indian Head Division letter 8000 Ser 440E/253 (03) of 29 September 2003, Subject: WAU-10 Fragment/Debris Estimates

Reference (a) requested Department of Defense Explosives Safety Board (DDESB) approval of modifications to reference (b); to correct a net explosive weight (NEW) error associated with the AIM-9L and AIM-9M Warheads and to revise quantity-distance (QD) for aircraft configurations involving the AIM-7 (WAU-10) Warhead, based on the reference (c) assessment/analysis of the results of a WAU-10/B Warhead test.

Approval is granted for the requested changes to F-15 and F-16 aircraft configuration criteria as reflected in attachment 1. We note that the initial aircraft configuration criteria of reference (b) were developed to support the Air National Guard's Noble Eagle program, but that these criteria are now being transitioned for general use by DoD Components who might have similar aircraft load configurations and could benefit from the reduced QD for these missile loads.

The specific changes that are approved include:

- a. The application of a 199-foot hazardous fragment distance (HFD) for an accidental detonation involving a single AIM-7F missile with a WAU-10 Warhead, vice the 700-foot distance previously applied. The 199-foot HFD was determined using DDESB-approved methodology found in DDESB TP16.

b. Use of attachment 2 for determining the HFD associated with accidental detonations involving multiple AIM-7F Missiles with WAU-10 Warheads.

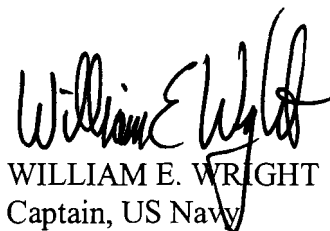
c. The reduction of QD for all aircraft configurations shown on Tables 13 and 14 of attachment 1 where QD was previously controlled by the 700-foot QD associated with the AIM-7 Missile with a WAU-10 Warhead. In all cases, the distances for those configurations were reduced to an HFD of 400 feet, which is now controlled by a missile other than an AIM-7 (WAU-10) Missile.

d. The correction of AIM-9L and M (WDU-17) Warhead NEW from 7.4 pounds to 7.9 pounds, and the correction of NEWs for aircraft configurations which include either of these missiles.

e. DDESB concurrence with the use of the worst-case missile HFD associated with an aircraft configuration for siting of an aircraft in a fabric shelter and use of the worst-case missile HFD (with a 279-foot minimum debris distance) for siting of an aircraft in a light metal structure, as reflected in Table 15 of attachment 1.

During missile loading/unloading operations, the MCE for which the aircraft location is sited will also be the MCE applicable to the trailer transporting the weapons to/from the aircraft location. The MCE can be controlled either by limiting the number of weapons on a trailer or through testing (i.e., testing of AIM-120 missiles loaded in a single layer, and in alternating directions) that has demonstrated that propagation is prevented, and the results have been approved by the DDESB.

DDESB point of contact is Mr. Eric Deschambault. He can be reached at commercial phone: (703)-325-1369; DSN: 221-1369; and email: [eric.deschambault@ddesb.osd.mil](mailto:eric.deschambault@ddesb.osd.mil).

  
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Attachments  
As stated

cc:  
NOSSA/N7D  
MARCORSYSCOM (AM/EES – Mr. George Morrison)  
USADAC (Mr. Ken Williams)

# UPDATED QUANTITY-DISTANCE DETERMINATIONS RESULTING FROM NOBLE EAGLE TESTING PROGRAM

## Section I – Background

The purpose of the Noble Eagle Testing Program was to establish Maximum Credible Events (MCEs) for the aircraft configurations shown in Table 1. The MCEs would then be used to develop quantity-distances. Table 2 shows the actual missile configurations (missile version and warhead type) used in the tests.

Table 1. Aircraft Configurations<sup>1</sup>

<b>F-16</b>	
Configuration 1	4 AIM-120 missiles, 2 AIM-9 missiles
Configuration 2	2 AIM-120 missiles, 2 AIM-9 missiles, 2 AIM-7 missiles
Configuration 3	2 AIM-120 missiles, 4 AIM-9 missiles
Configuration 4 <sup>2</sup>	6 AIM-120 missiles
<b>F-15</b>	
Configuration 1	4 AIM-120 missiles, 2 AIM-9 missiles, 2 AIM-7 missiles
Configuration 2	4 AIM-9 missiles, 4 AIM 7 missiles
Configuration 3	6 AIM-120 missiles, 2 AIM-9 missiles

Note 1: Configuration numbers **do not** correspond to configuration numbers in AFMAN 91-201.

Note 2: This configuration was actually tested prior to the Noble Eagle test program. It is included here for purposes of obtaining DDESB approval.

Table 2. Missile Configurations

<b>Missile</b>	<b>Missile NEWQD</b>	<b>Basis for Missile NEWQD</b>
AIM-120, WDU-33/B Warhead	16.9 lbs	Warhead NEWQD (15 lbs) plus some motor contribution.
AIM-120, WDU-41/B Warhead	19.0 lbs	Warhead NEWQD (16 lbs) plus some motor contribution.
AIM-9L or M, WDU-17 Warhead	7.9 lbs	Warhead NEWQD only.
AIM-9P	10.5 lbs	Warhead NEWQD only.
AIM-7M, WAU-17 Warhead	36.0 lbs	Warhead NEWQD only.
AIM-7F, WAU-10 Warhead	26.1 lbs	Warhead NEWQD only.

## Section II – Test Results

Table 3 shows the single missile hazard fragment distances (HFD) determined as part of the Noble Eagle Test Program.

Table 3. Test Results – Single Missile Hazard Fragment Distances

Missile	Single Missile Hazardous Fragment Distance (HFD)
AIM-120, WDU-33/B Warhead	280 ft <sup>1</sup>
AIM-120, WDU-41/B Warhead	335 ft <sup>1</sup>
AIM-9L or M, WDU-17 Warhead	400 ft
AIM-9P, X Warhead	400 ft
AIM-7M, WAU-17 Warhead	280 ft
AIM-7F, WAU-10 Warhead	199 ft <sup>2</sup>

Note 1: From "Noble Eagle Fragment/Debris Questions," Michael M. Swisdak, Jr.

Note 2: From "WAU-10 Fragment/Debris Estimates," Michael M. Swisdak, Jr.

Tables 4 and 5 show the Maximum Credible Event (MCE) for each aircraft configuration from Table 1 above. In some cases for the F-15, the configurations are broken down into cases based on missile configurations and/or positions.

Table 4. Test Results – F-16 Aircraft Configuration Maximum Credible Events

Configuration	Maximum Credible Event (MCE) <sup>1,2</sup>
Configuration 1 (4 AIM-120s, 2 AIM-9s)	One AIM-120 and One AIM-9
Configuration 2 (2 AIM-120s, 2 AIM-9s, 2 AIM-7s)	One AIM-9 and One AIM-7
Configuration 3 (2 AIM-120s, 4 AIM-9s)	One AIM-120 and Two AIM-9s
Configuration 4 (6 AIM-120s)	One AIM-120

Note 1: For each missile type, the missile configuration present with the largest NEWQD would be used for calculation of the NEWQD of the configuration MCE. For example, in Configuration 4, if 3 AIM-120, WDU-33/Bs and 3 AIM-120, WDU-41/Bs were present, the NEWQD for the Maximum Credible Event would be 19 lbs (the NEWQD of one AIM-120, WDU-41/B).

Note 2: HFD is based on the largest HFD of any single missile present.

Table 5. Test Results – F-15 Aircraft Configuration Maximum Credible Events

Configuration	Maximum Credible Event (MCE) <sup>1,2</sup>
Configuration 1 (4 AIM-120s, 2 AIM-9s, 2 AIM-7s)	
Case 1 – AIM-7s in Rear Fuselage Position	<i>Use whichever produces largest NEWQD:</i> One AIM-7 or One AIM-120 and One AIM-9
Case 2 – AIM-7s in Front Fuselage Position	One AIM-9 and One AIM-7
Configuration 2 (4 AIM-9s, 4 AIM-7s)	
Case 1 – AIM-7Ms in Front Fuselage Position, and any AIM-9Ps	Two AIM-9s and One AIM-7
Case 2 – AIM-7Fs in Front Fuselage Position	One AIM-7
Case 3 – Only AIM-7Ms, and only AIM-9Ls or 9Ms	One AIM-7
Configuration 3 (6 AIM-120s, 2 AIM-9s)	One AIM-120 and One AIM-9

Note 1: For each missile type, the missile configuration present with the largest NEWQD would be used for calculation of the NEWQD of the configuration MCE. For example, in Configuration 2, Case 2, if 2 AIM-7Fs and 2 AIM-7Ms were present, the NEWQD for the Maximum Credible Event would be 36 lbs (the NEWQD of one AIM-7M).

Note 2: HFD is based on the largest HFD of any single missile present.

### Section III – Initial Quantity-Distance Determinations for Aircraft in the Open

Tables 6 through 12 show the initial Q-D determinations for aircraft in the open.

Table 6. Initial Q-D Determinations for F-16, Configuration 1, in the Open

Configuration 1 (4 AIM-120s, 2 AIM-9s)	MCE <sup>1</sup>	NEWQD for MCE	HFD/IBD <sup>2</sup>	PTR <sup>3</sup>	IL <sup>4</sup>	IM <sup>5</sup>
a. Only AIM-120, WDU-33/Bs Only AIM-9Ls or 9Ms	One AIM-120, WDU-33/B and One AIM-9L/M	24.8 lbs	400 ft (AIM-9L/M)	240 ft	53 ft	100 in
b. Any AIM-120, WDU-41/Bs Only AIM-9Ls or 9Ms	One AIM-120, WDU-41/B and One AIM-9L/M	26.9 lbs	400 ft (AIM-9L/M)	240 ft	54 ft	100 in
c. Only AIM-120, WDU-33/Bs Any AIM-9Ps	One AIM-120, WDU-33/B and One AIM-9P	27.4 lbs	400 ft (AIM-9P)	240 ft	55 ft	100 in
d. Any AIM-120, WDU-41/Bs Any AIM-9Ps	One AIM-120, WDU-41/B and One AIM-9P	29.5 lbs	400 ft (AIM-9P)	240 ft	56 ft	100 in

Note 1: MCE is based on rule from Table 4.

Note 2: HFD is based on the largest HFD of any single missile present. The HFD is also the IBD, because in all cases it exceeds K40 using the NEWQD for MCE.

Note 3: PTR is 60% of IBD.

Note 4: IL is K18, using the NEWQD for MCE.

Note 5: Assumes AIM-120s are on the wing tips. IM is 36 inches if AIM-9s are on the wing tips (to maintain 100 inches between AIM-120s).

Table 7. Initial Q-D Determinations for F-16, Configuration 2, in the Open

Configuration 2 (2 AIM-120s, 2 AIM-9s, 2 AIM-7s)	MCE <sup>1</sup>	NEWQD for MCE	HFD/IBD <sup>2</sup>	PTR <sup>3</sup>	IL <sup>4</sup>	IM <sup>5</sup>
a.1 Only AIM-9Ls or 9Ms Only AIM-7Fs	One AIM-9L/M and One AIM-7F	34.0 lbs	400 ft (AIM-9L/M)	240 ft	59 ft	100 in
a.2 Any AIM-9Ps Only AIM-7Fs	One AIM-9P and One AIM-7F	36.6 lbs	400 ft (AIM-9P)	240 ft	60 ft	100 in
b.1 Only AIM-9Ls or 9Ms Any AIM-7Ms	One AIM-9L/M and One AIM-7M	43.9 lbs	400 ft (AIM-9L/M)	240 ft	64 ft	100 in
b.2 Any AIM-9Ps Any AIM-7Ms	One AIM-9P and One AIM-7M	46.5 lbs	400 ft (AIM-9P)	240 ft	65 ft	100 in

Note 1: MCE is based on rule from Table 4.

Note 2: HFD is based on the largest HFD of any single missile present. The HFD is also the IBD, because in all cases it exceeds K40 using the NEWQD for MCE.

Note 3: PTR is 60% of IBD.

Note 4: IL is K18, using the NEWQD for MCE.

Note 5: Assumes AIM-120s are on the wing tips. IM is 36 inches if AIM-9s are on the wing tips (to maintain 100 inches between AIM-120s).

Table 8. Initial Q-D Determinations for F-16, Configuration 3, in the Open

Configuration 3 (2 AIM-120s, 4 AIM-9s)	MCE <sup>1</sup>	NEWQD for MCE	HFD/IBD <sup>2</sup>	PTR <sup>3</sup>	IL <sup>4</sup>	IM <sup>5</sup>
a. Only AIM-120, WDU-33/Bs Only AIM-9Ls or 9Ms	One AIM-120, WDU-33/B and Two AIM-9L/Ms	32.7 lbs	400 ft (AIM-9L/M)	240 ft	58 ft	100 in
b. Any AIM-120, WDU-41/Bs Only AIM-9Ls or 9Ms	One AIM-120, WDU-41/B and Two AIM-9L/Ms	34.8 lbs	400 ft (AIM-9L/M)	240 ft	59 ft	100 in
c. Only AIM-120, WDU-33/Bs Any AIM-9Ps	One AIM-120, WDU-33/B and Two AIM-9Ps	37.9 lbs	400 ft (AIM-9P)	240 ft	61 ft	100 in
d. Any AIM-120, WDU-41/Bs Any AIM-9Ps	One AIM-120, WDU-41/B and Two AIM-9Ps	40.0 lbs	400 ft (AIM-9P)	240 ft	62 ft	100 in

Note 1: MCE is based on rule from Table 4.

Note 2: HFD is based on the largest HFD of any single missile present. The HFD is also the IBD, because in all cases it exceeds K40 using the NEWQD for MCE.

Note 3: PTR is 60% of IBD.

Note 4: IL is K18, using the NEWQD for MCE.

Note 5: Assumes AIM-120s are on the wing tips. IM is 36 inches if AIM-9s are on the wing tips (to maintain 100 inches between AIM-120s).

Table 9. Initial Q-D Determinations for F-16, Configuration 4, in the Open

Configuration 4 (6 AIM-120s)	MCE <sup>1</sup>	NEWQD for MCE	HFD/IBD <sup>2</sup>	PTR <sup>3</sup>	IL <sup>4</sup>	IM
a. Only AIM-120, WDU-33/Bs	One AIM-120, WDU-33/B	16.9 lbs	280 ft (AIM-120, WDU-33/B)	168 ft	47 ft	100 in
b. Any AIM-120, WDU-41/Bs	One AIM-120, WDU-41/B	19.0 lbs	335 ft (AIM-120, WDU-41/B)	201 ft	48 ft	100 in

Note 1: MCE is based on rule from Table 4.

Note 2: HFD is based on the largest HFD of any single missile present. The HFD is also the IBD, because in all cases it exceeds K40 using the NEWQD for MCE.

Note 3: PTR is 60% of IBD.

Note 4: IL is K18, using the NEWQD for MCE.

Table 10. Initial Q-D Determinations for F-15, Configuration 1, in the Open

Configuration 1 (4 AIM-120s, 2 AIM-9s, 2 AIM-7s)	MCE <sup>1</sup>	NEWQD for MCE	HFD/IBD <sup>2</sup>	PTR <sup>3</sup>	IL <sup>4</sup>	IM <sup>5</sup>
Case 1 – AIM-7s in Rear Fuselage Position						
a.1 Only AIM-7Fs Only AIM-9Ls or 9Ms Only AIM-120, WDU-33/Bs	One AIM-7F	26.1 lbs	400 ft (AIM-9L/M)	240 ft	54 ft	100 in
a.2 Only AIM-7Fs Only AIM-9Ls or 9Ms Any AIM-120, WDU-41/Bs	One AIM-120, WDU-41/B and One AIM-9L/M	26.9 lbs	400 ft (AIM-9L/M)	240 ft	54 ft	100 in
a.3 Only AIM-7Fs Any AIM-9Ps Only AIM-120, WDU-33/Bs	One AIM-120, WDU-33/B and One AIM-9P	27.4 lbs	400 ft (AIM-9P)	240 ft	55 ft	100 in
a.4 Only AIM-7Fs Any AIM-9Ps Any AIM-120, WDU-41/Bs	One AIM-120, WDU-41/B and One AIM-9P	29.5 lbs	400 ft (AIM-9P)	240 ft	56 ft	100 in
b. Only AIM-7Ms	One AIM-7M	36.0 lbs	400 ft (AIM-9L/M/P)	240 ft	60 ft	100 in
Case 2 – AIM-7s in Front Fuselage Position						
a.1 Only AIM-7Fs Only AIM-9Ls or 9Ms	One AIM-7F and One AIM-9L/M	34.0 lbs	400 ft (AIM-9L/M)	240 ft	59 ft	100 in
a.2 Only AIM-7Fs Any AIM-9Ps	One AIM-7F and One AIM-9P	36.6 lbs	400 ft (AIM-9P)	240 ft	60 ft	100 in
b.1 Any AIM-7Ms Only AIM-9Ls or 9Ms	One AIM-7M and One AIM-9L/M	43.9 lbs	400 ft (AIM-9L/M)	240 ft	64 ft	100 in
b.2 Any AIM-7Ms Any AIM-9Ps	One AIM-7M and One AIM-9P	46.5 lbs	400 ft (AIM-9P)	240 ft	65 ft	100 in

Note 1: MCE is based on rule from Table 5.

Note 2: HFD is based on the largest HFD of any single missile present. The HFD is also the IBD, because in all cases it exceeds K40 using the NEWQD for MCE.

Note 3: PTR is 60% of IBD.

Note 4: IL is K18, using the NEWQD for MCE.

Note 5: Assumes AIM-120s are on the wing tips. IM is 36 inches if AIM-9s are on the wing tips (to maintain 100 inches between AIM-120s).



Table 11. Initial Q-D Determinations for F-15, Configuration 2, in the Open

Configuration 2 (4 AIM-9s, 4 AIM-7s)	MCE <sup>1</sup>	NEWQD for MCE	HFD/IBD <sup>2</sup>	PTR <sup>3</sup>	IL <sup>4</sup>	IM <sup>5</sup>
Case 1 – AIM-7Ms in Front Fuselage Position, Any AIM-9Ps						
a. AIM-7Fs in Rear	One AIM-7M and Two AIM-9Ps	57.0 lbs	400 ft (AIM-9P)	240 ft	70 ft	22 in
b. AIM-7Ms in Rear	One AIM-7M and Two AIM-9Ps	57.0 lbs	400 ft (AIM-9P)	240 ft	70 ft	22 in
Case 2 – AIM-7Fs in Front Fuselage Position, Any AIM-9Ps						
a. AIM-7Fs in Rear	One AIM-7F	26.1 lbs	400 ft (AIM-9P)	240 ft	54 ft	22 in
b. AIM-7Ms in Rear	One AIM-7M	36.0 lbs	400 ft (AIM-9P)	240 ft	60 ft	22 in
Case 3 – Only AIM-7Ms, Only AIM-9Ls or 9Ms	One AIM-7M	36.0 lbs	400 ft (AIM-9L/M)	240 ft	60 ft	22 in

Note 1: MCE is based on rule from Table 5.

Note 2: HFD is based on the largest HFD of any single missile present. The HFD is also the IBD, because in all cases it exceeds K40 using the NEWQD for MCE.

Note 3: PTR is 60% of IBD.

Note 4: IL is K18, using the NEWQD for MCE.

Note 5: For all cases presented for this configuration, the AIM-9s are on the outer stations and the AIM-7s are on the fuselage. Although the IM between the AIM-9s is 22 inches, the aircraft structure precludes the AIM-9s from being this close.

Table 12. Initial Q-D Determinations for F-15, Configuration 3, in the Open

Configuration 3 (6 AIM-120s, 2 AIM-9s)	MCE <sup>1</sup>	NEWQD for MCE	HFD/IBD <sup>2</sup>	PTR <sup>3</sup>	IL <sup>4</sup>	IM <sup>5</sup>
a. Only AIM-120, WDU-33/Bs Only AIM-9Ls or 9Ms	One AIM-120, WDU-33/B and One AIM-9L/M	24.8 lbs	400 ft (AIM-9L/M)	240 ft	53 ft	100 in
b. Any AIM-120, WDU-41/Bs Only AIM-9Ls or 9Ms	One AIM-120, WDU-41/B and One AIM-9L/M	26.9 lbs	400 ft (AIM-9L/M)	240 ft	54 ft	100 in
c. Only AIM-120, WDU-33/Bs Any AIM-9Ps	One AIM-120, WDU-33/B and One AIM-9P	27.4 lbs	400 ft (AIM-9P)	240 ft	55 ft	100 in
d. Any AIM-120, WDU-41/Bs Any AIM-9Ps	One AIM-120, WDU-41/B and One AIM-9P	29.5 lbs	400 ft (AIM-9P)	240 ft	56 ft	100 in

Note 1: MCE is based on rule from Table 5.

Note 2: HFD is based on the largest HFD of any single missile present. The HFD is also the IBD, because in all cases it exceeds K40 using the NEWQD for MCE.

Note 3: PTR is 60% of IBD.

Note 4: IL is K18, using the NEWQD for MCE.

Note 5: Assumes AIM-120s are on the wing tips. IM is 36 inches if AIM-9s are on the wing tips (to maintain 100 inches between AIM-120s).

## **Section IV – Final Quantity-Distance Determinations for Aircraft in the Open**

Tables 13 and 14 show the final Q-D determinations for aircraft in the open. The Q-D presented in these tables are only for the aircraft and missile configurations described in Tables 1 and 2.

The variations presented in Tables 6 through 12 have been reduced for purposes of simplification. In many instances, only slight differences in NEWQDs and IL distances existed between some variations. AFSC/SEW determined these differences were not significant, and elected to apply the worst-case NEWQD and IL distance (we will request MAJCOM/SEW concurrence of this determination).

The IM distances presented in Tables 6 through 12 are superseded by the minimum aircraft separation requirement of 10ft, per normal flightline criteria. Therefore, AFSC/SEW has elected to use 10 ft as the default IM distance between aircraft in all cases. However, units may request lesser distances (down to those in Tables 6 through 12) if circumstances require. AFSC/SEW will approve these on a case-by-case basis.

Table 13. Q-D for F-16 Aircraft in the Open

See Notes 1 and 2	NEW QD for MCE	HFD/IBD	PTR	IL	IM <sup>3</sup>
<b>Configuration 1</b> 4 AIM-120s, 2 AIM-9s	29.5 lbs	400 ft	240 ft	56 ft	10 ft
<b>Configuration 2a</b> 2 AIM-120s, 2 AIM-9s, 2 AIM-7Fs	36.6 lbs	400 ft	240 ft	60 ft	10 ft
<b>Configuration 2b</b> 2 AIM-120s, 2 AIM-9s, 2 AIM-7Ms	46.5 lbs	400 ft	240 ft	65 ft	10 ft
<b>Configuration 3</b> 2 AIM-120s, 4 AIM-9s	40.0 lbs	400 ft	240 ft	62 ft	10 ft
<b>Configuration 4a</b> 6 AIM-120, WDU-33/Bs	16.9 lbs	280 ft	168 ft	47 ft	10 ft
<b>Configuration 4b</b> 6 AIM-120s, with one or more being an AIM-120, WDU-41/B	19.0 lbs	335 ft	201 ft	48 ft	10 ft

Note 1: Configuration numbers **do not** correspond to configuration numbers in AFMAN 91-201.

Note 2: Unless otherwise specified,

- AIM-120s must be AIM-120, WDU-33/Bs and/or AIM-120, WDU-41/Bs
- AIM-9s must be AIM-9L, WDU-17s, and/or AIM-9M, WDU-17s, and/or AIM-9P
- AIM-7s must be AIM-7M, WDU-17s and/or AIM-7F, WDU-10s

Note 3: This IM is based on the minimum aircraft separation requirement of 10 ft. If circumstances require locating aircraft at less than this distance, then lesser IM distances may be approved with AFSC/SEW. Request approval through MAJCOM/SEW.

Table 14. Q-D for F-15 Aircraft in the Open

See Notes 1 and 2	NEWQD for MCE	HFD/IBD	PTR	IL	IM <sup>3</sup>
<b>Configuration 1, Case 1a</b> 4 AIM-120s, 2 AIM-9s, 2 AIM-7Fs in Rear Fuselage Position	29.5 lbs	400 ft	240 ft	56 ft	10 ft
<b>Configuration 1, Case 1b</b> 4 AIM-120s, 2 AIM-9s, 2 AIM-7Ms in Rear Fuselage Position	36.0 lbs	400 ft	240 ft	60 ft	10 ft
<b>Configuration 1, Case 2a</b> 4 AIM-120s, 2 AIM-9s, 2 AIM-7Fs in Front Fuselage Position	36.6 lbs	400 ft	240 ft	60 ft	10 ft
<b>Configuration 1, Case 2b</b> 4 AIM-120s, 2 AIM-9s, 2 AIM-7Ms in Front Fuselage Position	46.5 lbs	400 ft	240 ft	65 ft	10 ft
<b>Configuration 2, Case 1</b> 2 AIM-7Ms in Front Fuselage Position, 2 AIM-7Fs or Ms in Rear Fuselage Position, 4 AIM-9s	57.0 lbs	400 ft	240 ft	70 ft	10 ft
<b>Configuration 2, Case 2a</b> 4 AIM-7Fs, 4 AIM-9s	26.1 lbs	400 ft	240 ft	54 ft	10 ft

Table 14. Q-D for F-15 Aircraft in the Open (Continued)

See Notes 1 and 2	NEWQD for MCE	HFD/IBD	PTR	IL	IM
<b>Configuration 2, Case 2b</b> 2 AIM-7Fs in Front Fuselage Position, 2 AIM-7Ms in Rear Fuselage Position, 4 AIM-9s	36.0 lbs	400 ft	240 ft	60 ft	10 ft
<b>Configuration 2, Case 3</b> 4 AIM-7Ms, 4 AIM-9Ls or 9Ms	36.0 lbs	400 ft	240 ft	60 ft	10 ft
<b>Configuration 3</b> 6 AIM-120s, 2 AIM-9s	29.5 lbs	400 ft	240 ft	56 ft	10 ft

Note 1: Configuration numbers **do not** correspond to configuration numbers in AFMAN 91-201.

Note 2: Unless otherwise specified,

- AIM-120s must be AIM-120, WDU-33/Bs and/or AIM-120, WDU-41/Bs
- AIM-9s must be AIM-9L, WDU-17s, and/or AIM-9M, WDU-17s, and/or AIM-9P, 10.5lb Warheads
- AIM-7s must be AIM-7M, WAU-17s and/or AIM-7F, WAU-10s

Note 3: This IM is based on the minimum aircraft separation requirement of 10 ft. If circumstances require locating aircraft at less than this distance, then lesser IM distances may be approved with AFSC/SEW. Request approval through MAJCOM/SEW.

## Section V – Considerations for Aircraft in Buildings

Table 15 applies to aircraft configurations of Tables 13 and 14 when located in one of the structures shown below. For structures of heavier construction, conduct a structural analysis per TM5-1300 to determine the appropriate debris IB distance to apply.

Table 15. Q-D for Table 13 and 14 Aircraft Configurations in Light Structures.

	IB	PTR	IL/IM
Fabric/Tubular Shelter or Light Metal Structure	Aircraft Configuration HFD <sup>1</sup>	Note 2	Note 3

Note 1: Minimum debris distance of 279 feet applies when in a light metal structure. No minimum debris distance applies to a fabric/tubular shelter.

Note 2: PTR is 60% of HFD.

Note 3: IL and IM distances are the same as determined for “open” in previous section.

**HAZARDOUS FRAGMENT DISTANCE (feet/meters)**

ITEM	NUMBER OF ITEMS									
	1	2	3	4	5	6	7	8	9	10
WAU-10/B	199	291	364	426	482	533	580	624	666	706
	60.6	88.8	110.9	130	146.9	162.4	176.8	190.3	203	215.1